## REMARKS/ ARGUMENTS

Currently, claims 1-44 are pending, and each stand rejected. In the Official Action, claims 1-3, 7-8, 15-18, 20-22, 28-30, 32, 36-37, and 41 were rejected as anticipated by Raabe (US 5322057); Claims 4-6, 19, 23, 24, 31, 33-35, and 42-44 were rejected as being obvious over Raabe; Claims 9-14, 38-39 were rejected as being obvious over Raabe in light of Goodman (US 5813397); Claim 40 was rejected as being obvious over Raabe in light of Landis (US 4648393); and Claims 25-27 were rejected as being obvious over Raabe in light of Targell (US 5310092).

### 1. The Drawings Comply with MPEP §608.02(g)

Applicant has included a substitute of Figure 1 that identifies it as Prior Art as requested by the Examiner. Applicants assert these Figures are in compliance with 608.02(g), and withdrawal of the objection is appropriate.

### 2. Claim 1 is Rewritten in Less Structural Terms

Claim 1 has been amended to employ the less structural term "correlated", rather than "coupled", as suggested by the examiner, for the sake of clarity. Withdrawal of the rejection is requested.

**3. Claims 1-3, 7-8, 15-18, 20-22, 28-30, 32, 36-37 And 41 Are Not Anticipated; Raabe Does Not Disclose A "Portable, Hand-Held, Patient-Operable Device" Where The "Release Mechanism" Is Actuated At The "End Of The Exhalation Phase".**

To anticipate a claim, a single piece of prior art must disclose each limitation of the claim. Claim 1 is not anticipated by Raabe, as each limitation is not found in the reference.

Claim 1, as amended, claims a "portable", "handheld" and "patient-operable" device. The Detailed Description of Raabe does not describe such a device. Rather, Raabe describes a complex, table-top nebulizer, sized for use in an institutional environment (*See, Raabe, Figure 2*). This nebulizer is either integrated with or is suitable for integration with a respirator, ventilator or other breathing machine. Breathing machines and their components are not hand-held and portable. These features of the claimed invention are not disclosed in Raabe.

Further, the Raabe system is directed to a medicament delivery system that is not patient-operable, as called for in Claim 1. The Raabe device is operated by a physician, as Raabe clearly indicates that their device is used with a respirator where the patient is unable to breath on their own. (*See, Col.1 Lines 17-23*). Because the respirator controls the breathing pattern of a patient, Raabe does not have to deal with the problem of appropriately timing the release of medicament from a medicament container.

Claim 1 requires that actuation of the actuator for actuating the release mechanism is actuated in response to a signal generated at a trigger point at the end of the exhalation phase. Raabe, however, initiates release of medicament from the medicament container at the beginning of the exhalation phase, *See,* column col. 6, lines 28-34.

Contrary to the statements of the examiner, the airway pressure sensor 15, upstream pressure sensor 77 and downstream pressure sensor 79 are not monitors for measuring a breathing cycle of a patient with the purpose of generating a signal which causes actuation of a release mechanism for releasing a medicament from a

medicament container, the monitor providing a signal at a trigger point which is correlated to the end of the exhalation phase of the breathing cycle. As explained in col. 7, line 6-25, sensors 77 and 79, when used for measuring breathing pressures (rather than as a safety feature) are able to produce signals which are fed to microprocessor 9 at the beginning of exhalation to begin aerosol generation through nebulizers 22. Sensors 77/79 are designed as a redundancy to the electronic signal source 72, which was not mentioned by the examiner, which is the primary signaler to the microprocessor 9 at the beginning of the exhalation phase (*See, col. 5, lines 27-31*) and which causes the microprocessor to activate solenoids 6 feeding nebulizers 22 to start nebulization (*See, col.5, lines 39-47*). Further, sensor 15 monitors pressure in inhalation tube that is supplied to the microprocessor 9 (*See, col. 4, lines 52-55*), to provide a safety signal to shut off the aerosolization in the event pressure within the inhalation tube 71 builds to an excessive level or if inhalation begins. (*See, col. 5, lines 62-68*).

As such Raabe does not disclose a sensor measuring the end of the exhalation phase which causes actuation, as claimed in the present invention. In light of the above, the subject matter of claim 1 is not anticipated. By implication of being dependent from claims 1, each of claims 2-41 are also not anticipated. Withdrawal of the 102 rejection of the above claims is respectfully requested.

**4. Claims 4-6, 19, 23-24, 31, 33-35 & 42-44 are not Obvious over Raabe**

The determination of obviousness is a legal conclusion based on factual inquiries including (1) the scope and content of the prior art; (2) the level of ordinary skill in the prior art; (3) the differences between the claimed invention and the prior art; and (4) objective evidence of nonobviousness. Graham v. John Deere Co., 148 USPQ 459, 467 (1966).

To render a claim obvious, the examiner has to show that the prior art would have motivated or suggested to one of ordinary skill in the art, at the time the claimed invention was made, to modify the prior art in such a way to yield the claimed invention, *see, e.g.,* C.R. Bard, v. M3 Sys., Inc., 48 USPQ2d 1225, 1232 (Fed. Cir. 1998).

The claims of the application are directed to an inhalation device which a patient may use independent of physician assistance which overcomes the issue of breath coordination and medicament release, which is hand-held, portable, and contains a triggering system allowing for release of medicament at the end of the exhalation phase. Triggering at the end of the exhalation phase optimizes the efficiency of delivery, as it allows the full breath to be used to inhale the dose which has just been released by the release mechanism. Timing the release of at the end of the exhalation phase, in certain configurations allows the mouth of the patient to act to some degree as a "spacer" chamber, potentially providing improved aerosol performance, *See page 2, lines 26-32 of the instant specification.* In addition, end of exhalation release prevents a patient's exhalation breath from blowing the dose out of the device prior to inhalation, which would occur if the actuation of medicament release occurs at the beginning of the exhalation phase as in Raabe.

As described in the immediately preceding section (§3), the Raabe reference does not teach a "portable, hand-held" device, nor a "patient-operable" device, elements incorporated in both claims 1 and 42, and therefore all the remaining pending claims by virtue of their dependency from claims 1 and 42. Raabe, in contrast, deals with a nebulizer designed to be incorporated in a respirator. The respirator is set up to artificially ventilate the lungs of a patient who cannot breathe

unaided (Raabe, Col. 1, lines 20-23). The present claims are directed toward a different problem then Raabe, i.e., breath coordination where the patient is breathing independently. Such breath coordination is not a problem in Raabe, as the both breathing and medicament delivery are mechanically controlled.

Raabe is also distinguishable from claims 1 and 42, as it fails to describe a device triggering actuation of a medicament release mechanism at a trigger point which is correlated to the end of the exhalation part of a breath cycle. Upon a thorough review of Raabe, it is clear that in Raabe, solenoids 6 are opened at the beginning of the exhalation phase (*see, Col 5, lines 28-42*). Because the solenoids 6 aerosolize liquid at a relatively slow rate, nebulization occurs over many inhalation cycles and may take over 10 minutes to complete an overall therapy. Initiation of nebulization in Raabe, allows a sufficient amount of aerosol to be created, where in can be inhaled at the beginning of the inhalation phase. Contrary to the examiner's statements, Raabe does not motivate one of ordinary skill to modify its teachings to operate at the end of the exhalation phase, because doing so would not permit an adequate or maximal amount of aerosol to be created by nozzles 22 to be inhaled with the initial inhalation effort.

For these reasons, Raabe fails to render obvious any of the currently rejected claims, and withdrawal of the 103 rejection is therefore requested.

Applicant's respectfully disagree with the examiner's finding regarding claims 4, 5 and 6 for additional reasons. Claim 4 is non-obvious because although temperature sensors are known, they have not, to applicant's knowledge, been employed to act to trigger a signal effecting the actuation of a release mechanism on a medicament container, as required in claim 4. Such an arrangement is advantageous as this alternative triggering event/standard avoids the potential risk incumbent in using a pressure sensor. Attainable pressure may vary from patient-to-patient due to their size, age, gender, and overall health. While Raabe's reliance on a respirator's mechanical breathing assures breathing profile uniformity, such is not the case with a portable, hand-held, patient-operable device, such as claimed. Such alternative

measuring sensors, as claimed in claim 4, may provide assurances of proper medicament delivery at an appropriate time in the breathing cycle.

Although the examiner indicates in conclusory fashion that a pressure sensor and a temperature sensor are interchangeable, no citation indicating the acknowledgement by the art has been disclosed. The Patent Office is required to provide clear and convincing evidence showing that one skilled in the art would be motivated to combine references or modify a reference to arrive at the claimed invention. *See In re Dembiczak*, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999). "Broad conclusory statements regarding the teachings of multiple references standing alone, are not "evidence." *In re Dembiczak*, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999). Applicants respectfully submit that the Patent Office has not established a prima facie case of obviousness, especially in light of the applicants' showing that the difference is also a meaningful distinction from the pressure sensors discussed in Raabe.

This same basis of objection is used by the examiner for the actuation triggering sensor of claims 5 (moisture sensors) and claim 6 (oxygen and/or $CO_2$ sensors). These non-pressure sensors use non-standard measuring points to determine the suitable timing of releasing medicament to a patient. They are similarly situated to the sensor of claim 4, and are likewise non-obvious. The use of these measures are unique in themselves and

For these additional reasons, applicants request withdrawal of the 103 rejection of claims 4, 5 and 6 over Raabe.

Claim 24 is non-obvious for the additional reasons that the "headspace 26 & 31" is not used to meter the dose in Raabe. As explained in Raabe, the operational duration of the solenoids 6 in Raabe determines the amount of aerosol produced. Thus, Raabe's "headspace" is not a variable metering volume as claimed in claim 24.

**5. Goodman Nor Raabe Teach Every Limitation Of The Claimed Invention.**

Goodman does not remedy those inadequacies of Raabe, allowing a prima facie case of obviousness to be established as the missing elements of Raabe alone are not found in Goodman. Goodman is device which in part suggests control of medicament release in various parts of the inhalation phase. As stated in Goodman, it is an object of the invention to "provide a variable actuated valbve mechanism having an open state and a closed state for controlling the medication pulse "size, shape and frequency, to produce a pulse train having a selected particle distribution at a selected point or series of points in a patient's inspiratory flow, and further, to produce a pulse train so that the particle size distribution delivered at different points in the flow may be different. Goodman, like Raabe, also fails to operate at the end of the exhalation phase. Goodman therefore does not teach that which is lacking in Raabe. For this first reason, applicants respectfully submit that the combination does not establish a prima facie case of obviousness, for claims 1 and 42, and likewise for each of the dependent claims thereon.

Beyond this point appicant's also disagree with the examiner's additional observation regarding Goodman's alleged teaching of an active memory to store breathing cycle data would be adopted in Raabe. Raabe, as pointed out above, is a mechanically controlled breathing apparatus. The respirator already controls all aspects of a patient's breathing as the patient is unable to breath unaided. There would no motivation to store data with active memory which is already machine controlled and therefore uniform. This aspect of Goodman would not be imported in Raabe, as the motivation of Goodman for having such a system is not needed in Raabe. Claim 9 then is non-obvious for these additional reasons, as are claims 10-21 which depend from claim 9 directly or indirectly.

**6. The Combination of Raabe and Landis does not describe all limitations of claims 1, 42, let alone claim 40.**

Landis describes a breath actuated inhaler where the medicament release is triggered upon inhalation. It does not describe an inhaler triggered at the end of the exhalation phase. As previously discussed, Raabe does not describe an end of

exhalation trigger either. For this reason, the combination of Landis and Raabe fail to establish a prima facie case of obviousness.

Further, Landis's breath operated inhaler has a manual over-ride for dealing with dead battery. The manual over ride allows the user to actuate the device personally. Such a device and system makes sense as a patient/user would acknowledge the non-fining of the device and be able to operate it themselves in such an instance. Raabe, however is an attachment for a mechanical breathing apparatus, where the patient is unable to breath unaided. The Raabe device is set up to be operated not by the patient/user, but be a health care provider. It cannot be said that there is motivation to put in a Landis-type manual override into Raabe, a system whose user is so incapacitated that they cannot breath unaided (a condition which is usually experienced by the comatose or paralyzed).

**7. The Combination of Raabe and Targell does not describe all limitations of claims 1 or 42, let alone claim 25-27.**

As previously stated, Raabe does not disclose a "hand-held", "portable", "patient operable" device, whose actuator is triggered at the "end of the exhalation part of the breathing cycle." Targell does not describe an inhaler, although it does state that it could be used for dispensing liquid medicaments. Nor does it describe a "hand-held" device, a "patient-operable" device, nor a device which is triggered "at the end of the exhalation part of the breathing cycle." As such, it does not disclose all elements of claims 1 and 42, and by implication claims 25-27.

Pertaining to claim 27, Targell is silent to the features of this claim. Therefore, there is nothing in Targell to motivate one of ordinary skill to incorporate such features into Targell. As mentioned previously, the Patent Office is required to provide clear and convincing evidence showing that one skilled in the art would be motivated to combine references or modify a reference to arrive at the claimed invention. *See In re Dembiczak*, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999). "Broad conclusory statements regarding the teachings of multiple references standing alone, are not "evidence." *In re Dembiczak*, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999). Applicants respectfully submit that the Patent Office has not established a prima facie

case of obviousness, and the examiner's findings pertaining to Targell are of the type of conclusory statements the Federal Circuit has previously found deficient.

For these reasons, the applicants respectfully request that the objections of Claims 25-27 over Raabe and Targell be withdrawn.

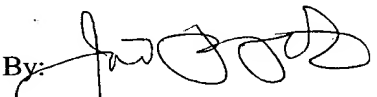
## 8. Conclusion

Applicant asserts that this application is now in condition for allowance, and respectfully requests that a timely Notice of Allowance be issued. Should any minor points preclude issuance of this case, the examiner is requested to contact the applicant's attorney at the number listed below.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge any fees or credit any overpayment, particularly including any fees required under 37 CFR Sect 1.16 or 1.17, and any necessary extension of time fees, to deposit Account No. 07-1392.

Respectfully submitted,

Date: 22 Dec 2003

By: 

JAMES P. RIEK

Attorney for Applicant

Reg. No. 39,009
Ph: (919) 483-8022
Fax: (919) 483-7988

**Customer No.: 23347**